

PATENT SPECIFICATION

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COMPLETE SPECIFICATION

DRAWINGS ATTACHED

A Mine Surge Car

We, PLACER EXPLORATION LIMITED, a Company registered under the laws of the Australian Capital Territory, of 81 Chiswick Road, Greenacre, New South Wales, Australia, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention has been devised to provide a mine car for use in conjunction with a continuous mining machine, for receiving mined material directly from the mining machine and transferring it to "shuttle" cars which latter convey the mined material to a main conveyor which then carries the mined material out of the mine or away from a working area in the mine.

The present invention will be described with particular reference to the coal mining industry but it is not restricted thereto. In the coal mining industry it is general practice to operate a mining machine on a mine working surface, and coal cut from the working face is deposited directly from the mining machine into shuttle cars which transport the cut coal to the belt conveyor system of the mine.

Two shuttle cars are usually used to move between the mining machine and the main conveyor, but this has proved unsatisfactory in that whilst the mining machine is designed to cut coal continuously, the loading of shuttle cars at the mining machine is intermittent. Thus, during normal mining operations, it frequently occurs that the mining machine has to be stopped to await the arrival of a shuttle car, as the shuttle cars cannot be constantly at the mining machine to receive coal therefrom and at the same time deliver coal to the main conveyor. As the mining machine may have a continuous mining capacity of 8-10 tons per minute for

example, it will be appreciated that considerable productions tonnage is lost each time the mining machine is stopped.

The object of the present invention is to provide a mine (surge) car which is located in juxtaposition to the continuous mining machine and receives coal directly therefrom as the coal is mined, which is of sufficient capacity to continuously receive and to hold cut coal whilst awaiting the arrival of shuttle cars to receive the cut coal therefrom, and which can transfer the cut coal to the shuttle cars rapidly.

According to the invention, the mine car comprises a wheeled vehicle adapted to be self-propelled and also adapted to be releasably coupled to the discharge end of a mining machine, said mine car including a storage compartment having downwardly inwardly sloping walls, a boom mounted on the end of the mine car remote from the coupled end, said boom projecting upwardly outwardly therefrom, a storage conveyor extending along the bottom of the storage compartment from the coupled end of the mine car to the boom end of the car and having a rising portion extending into a discharge opening formed through the boom end of the car, a discharge conveyor running longitudinally on the boom said discharge conveyor having one end thereof extending beneath the rising portion of the storage conveyor, means on the mine car for driving the conveyors, and control means for the conveyor driving means to independently start, inch and stop the storage conveyor and to start and stop the discharge conveyor.

The invention will be described with reference to the accompanying drawings, wherein:—

Figure 1 is a perspective view looking down into the mine car from the coupled

[Price 4s. 6d.]

end thereof.

Figures 2 and 3 are perspective views from opposite corners of the mine car.

Figures 4 and 5 are a side elevation and a plan, respectively, of the mine car.

Figure 6 is a plan view of an enlarged scale of the base from of the boom.

Figure 7 is a detail sectional view showing the connection of the outer frame of the boom to the base frame.

Figures 8 and 9 are longitudinal central sectional views of the drive rollers and bearing housings therefor, of the storage and discharge conveyors.

The car 1 is supported upon four wheels 2 and it includes a storage compartment 3 having downwardly inwardly sloping walls 4. It has coupling means indicated at 5 on one end thereof whereby it can be coupled to a mining machine, and it can be driven independently by traction motors 6 which drive two of the wheels 2. The vehicle also carries a hydraulic pump motor 7 and hydraulic fluid tank 7a, a hydraulic-electric control unit 8, and various junction boxes 9 for connecting electric leads to the motors 6, 7 referred to.

The car has a boom projecting upwardly outwardly from the end thereof remote from the coupled end. The boom consists of a base frame 10 having trunnions 11 on opposite sides and one end thereof and it is mounted in juxtaposition to the discharge opening in the boom end of the car 1, for pivotal movement in a vertical plane, in bearings and bearing housings indicated at 12 carried on each side of the car 1. The base frame 10 also has aligned stub shafts 13 projecting from each side thereof substantially medially thereof, which are each connected to the plunger of hydraulic cylinders 15 each supported upon a tray like extension 16 formed on each side of the car 1. This arrangement provides for up and down movement of the base frame 10 in a vertical plane.

The base frame 10 includes vertically spaced top and bottom plates 17, 18 which have aligned arcuate outer edges 19 formed thereon. The outer frame 20 of the boom also includes like spaced top and bottom plates 21, 22 which have the inner edges thereof similarly curved to slidably engage the arcuate edges 19 of the plates 17, 18. The outer frame 20 of the boom is connected to the base frame 10 for lateral pivotal movement relative thereto, by pairs of interleaved brackets 23, 24 and 25, 26 respectively fixed on the frames 10, 20 and which are connected by hinge pins 27.

The base frame 10 supports flexible (inner) side plates 28 which project outwardly therefrom along a part of each side of the outer frame 20. The outer frame 20 of the boom supports outer side plates 29

which overlap the inner sides 28 and which have telescopic connection as indicated at 30-31 with the inner sides 28. Each outer side also supports a hydraulic cylinder 32 which has a pulley 33 on its plunger 34. Each pulley 33 engages a cable 35. Each cable is fixed at one end to a cylinder 32, and fixed at its other end as at 36 to the base plate 10. This arrangement permits the outer frame 20 of the boom to be moved laterally approximately 45° each side of the central position seen in Figure 5, by the outer plates 29 sliding inwardly or outwardly along the corresponding inner plates 28, and the inner plates bending as seen in Figure 1.

A storage conveyor 37, Fig. 5, which runs along the bottom of the storage compartment 3 from the coupled end 5 to the boom end of the car 1, has a portion thereof rising upwardly from the compartment 2 into a discharge opening 38 formed in the boom end of the car 1. The storage conveyor 37 includes transversely spaced drive chains 39 having rigid conveyor flight bars 40 fixed to and between said chains 39 in longitudinally spaced relationship.

A discharge conveyor 41, Fig. 5, runs on the top plates 17-21 of the base frame 10 and outer frame 20 of the boom, and it includes a single central chain 42 having centrally articulated flight bars 43 projecting from each side thereof in longitudinally spaced relationship. The return run of the conveyor 41 is between the plates 17-21 and 18-22. The mounting of the flight bars 43 on chain 42 for articulating movement is effected by known means not forming part of the invention.

The storage conveyor 37 is supported upon drive roller 44 and idler roller 45 having sprockets 46 on each end thereof engaging the chains 39. The drive roller 44 is splined at each end to stub shafts 47 supported in bearing housings 48 carried by the car 1 on each side of the discharge opening 38. One stub shaft 47 is connected through couplings 49 and reduction drive unit 50, to drive motor 51, said drive unit 50 and motor 51 being carried by the tray 16 on one side of the car 1.

The discharge conveyor 41 is supported upon drive roller 52 and idler roller 53, which each have a sprocket 54 fixed medially thereon in engagement with chain 42. The drive roller 52 is splined at each end to stub shafts 55 supported in the bearing housings 12 and one stub shaft 55 is connected through couplings 56 and reduction drive unit 57 to drive motor 58, both of which latter are carried by the tray 16 on the other side of the car 1. The bearings for the trunnions 11 of the base frame 10 are secured in the inner side of the bearing housings 12 around stub shafts 55.

The discharge conveyor 41 extends at one end beneath the outer end of the storage conveyor 37 and at its other end, its idler roller 53 is freely mounted upon a non-rotating shaft 59 which is slidable longitudinally of the boom in aligned slots 60 formed in end members 61 fixed on the side plates 29. This non-rotating shaft 59 has a rod 62 fixed in each end thereof and the rods 62 each support a spring 63 located between the shaft 59 and a stop 64 carried on the end members 61. The tension on springs 63 is adjusted by nuts 65 on the rods 62 and this arrangement permits the spring tension to be maintained on the idler roller 53 regardless of the lateral movement imparted to the outer frame 20 of the boom, during relative sliding between the side plates 28-29 on each side of the boom, and bending of the side plates 28.

Electric power for operation of the various electric motors on the car 1 is supplied by an electric cable from the mining machine, when the car 1 is coupled to the mining machine and is receiving cut coal therefrom.

In one form of the invention, the starter contractors which supply power to said motors are contained in the control unit 8 attached to the car 1, and the control wiring for operation of these contractors is taken back to the mining machine operator's control position by a multi-core electric cable attached to the car 1 by means of a connector plug bolted to suitable boxes 9. Control levers 66, for effecting vertical and lateral movement of the boom, are situated on the car 1, as indicated.

In order to move the car 1 from its normal position behind the mining machine, the releasable coupling at 5 is disconnected and the electric supply and control cables are also disconnected from the boxes 9. A suitable length of flexible cable connected at one end to an independent source of power supply is then bolted to boxes 9 of the traction motors 6. The car 1 can then be driven into any portion of the mine under its own power independently of the mining machine. For this purpose, the car 1 includes steering controls and a foot brake.

In operation, the car 1 is coupled to the mining machine, and as coal is cut from the working face and is conveyed through the mining machine, it falls into the storage compartment 3 of the car 1. As the volume of coal thus deposited in the storage compartment 3 increases until it reaches the top level of the car walls 4, the mining machine operator selectively continuously drives or "inches" the storage conveyor 37 so that the coal is conveyed further into the car 1 and towards the discharge opening 38 of the car 1. During this process the discharge conveyor 41 is stationary, and the operation of the

storage conveyor 37 continues, either continuously or intermittently, until the car 1 is completely filled, or until such time as a shuttle car arrives to receive a load of coal. When a shuttle car is in position beneath the boom of the discharge conveyor 41, the mining machine operator presses the control button which starts the discharge conveyor 41 and the storage compartment 3 is discharged into the shuttle car at a fast rate.

In this manner the mining machine can operate continuously, and coal can be stored within the car 1 until the arrival of a shuttle car.

WHAT WE CLAIM IS:—

1. A mine car comprising a wheeled vehicle adapted to be self-propelled and also adapted to be releasably coupled to the discharge end of a mining machine, said mine car including a storage compartment having downwardly inwardly sloping walls, a boom mounted on the end of the mine car remote from the coupled end, said boom projecting upwardly outwardly therefrom, a storage conveyor extending along the bottom of the storage compartment from the coupled end of the mine car to the boom end of the car and having a rising portion extending into a discharge opening formed through the boom end of the car, a discharge conveyor running longitudinally on the boom said discharge conveyor having one end thereof extending beneath the rising portion of the storage conveyor, means on the mine car for driving the conveyors, and control means for the conveyor driving means to independently start, inch and stop the storage conveyor and to start and stop the discharge conveyor.

2. A mine car according to Claim 1, wherein the boom has two frame parts comprising a base frame pivotally mounted on the car in juxtaposition to the discharge opening for movement in a vertical plane, and an outer frame hingeably connected to the base frame for lateral movement on each side of the longitudinal centre line of the base frame, flexible, inner side plates being fixed on the base frame and projecting outwardly therefrom along a part of each side of the outer frame, outer side plates being fixed on the outer frame and overlapping the inner side plates each outer side plate and the adjacent inner side plate being telescopically connected together, said base frame being raised and lowered by a pair of hydraulic cylinder and plunger units mounted one on each side of the car, said outer frame being moved laterally by a pair of hydraulic cylinder and plunger units mounted one on each outer side plates, the plungers of the hydraulic units on the outer side plates each having a pulley on its outer end engaging a cable fixed at one of its

ends to the plunger cylinder and fixed at its other end to the base frame.

3. A mine car according to Claim 2, wherein the outer side plates each have an end member fixed thereon and the end members have aligned slots formed therein said slots extending in the longitudinal direction of the boom, and wherein the discharge conveyor has the other end thereof running over an idler roller freely mounted on a shaft mounted in said slots, tensioning springs being adjustably secured to each end of said shaft and to said end members.
4. A mine car according to Claim 2, wherein the base frame includes spaced top and bottom plates having aligned arcuate outer edges, and the outer frame has like spaced top and bottom plates having the inner edges thereof similarly curved to slidably engage the outer edges of the base frame, said base frame and said outer frame

having pairs of interleaved brackets fixed thereon and connected together by hinge pins.

5. A mine car according to any one of the preceding Claims, wherein the storage conveyor comprises transversely spaced chains having rigid conveyor flight bars fixed to and between said chains in longitudinally spaced relationship.

6. A mine car according to any one of the preceding Claims, wherein the discharge conveyor comprises a single central chain having articulated flight bars projecting from each side thereof in longitudinally spaced relationship.

7. A mine car as herein described with reference to the accompanying drawings.

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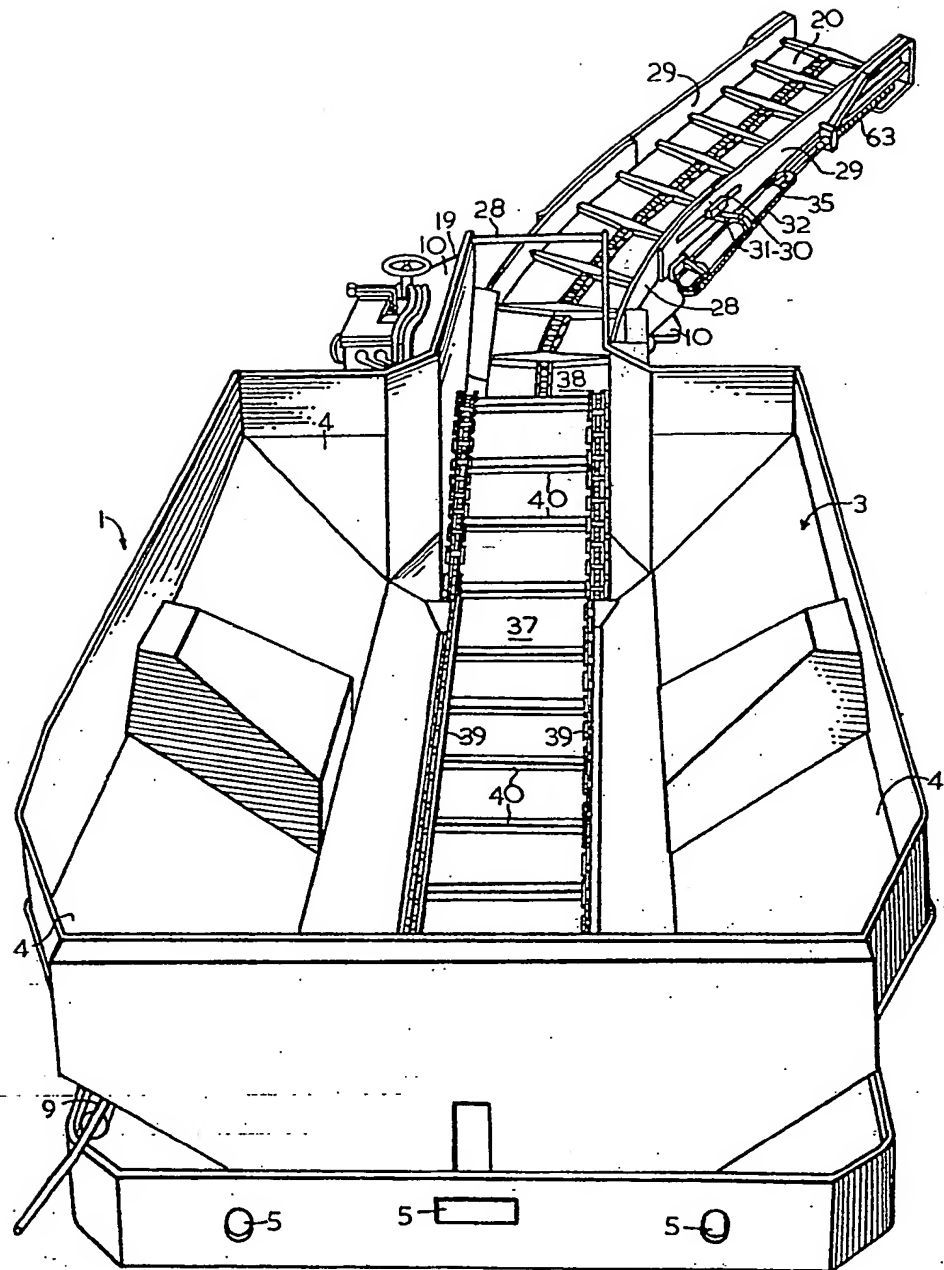


FIG. 1

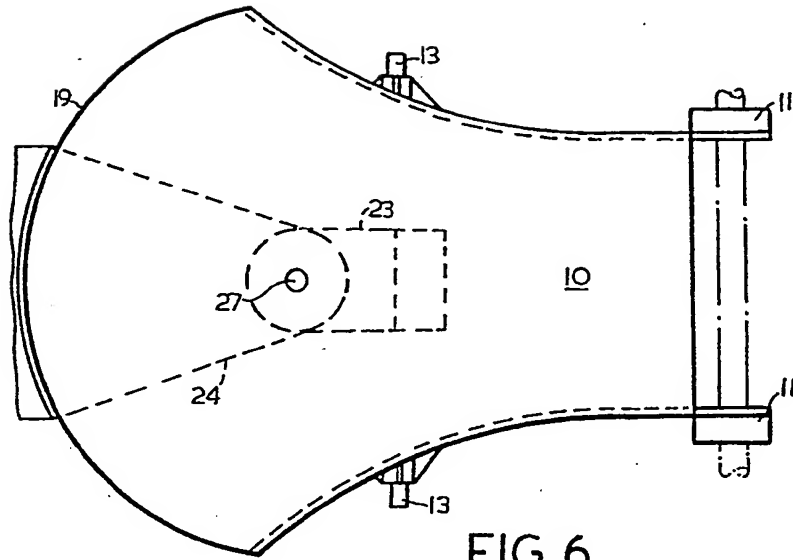
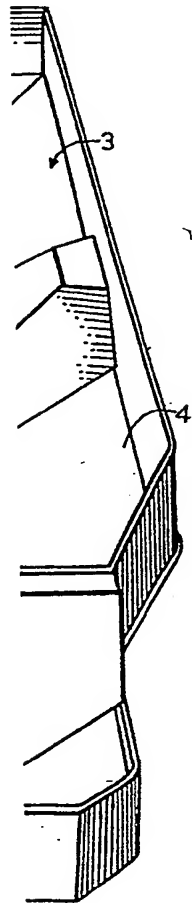
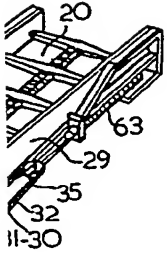


FIG. 6

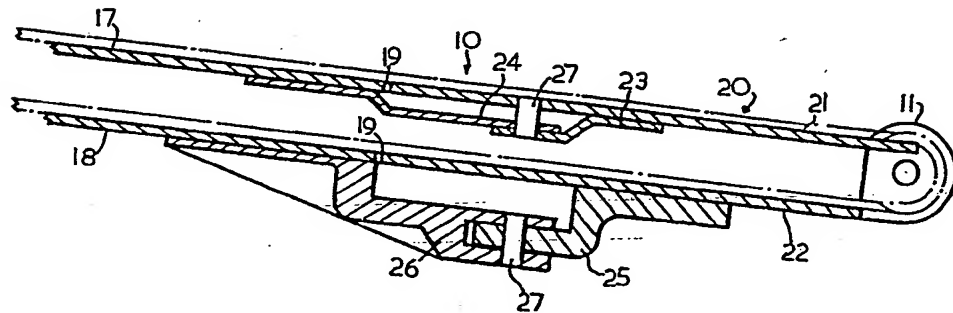


FIG. 7

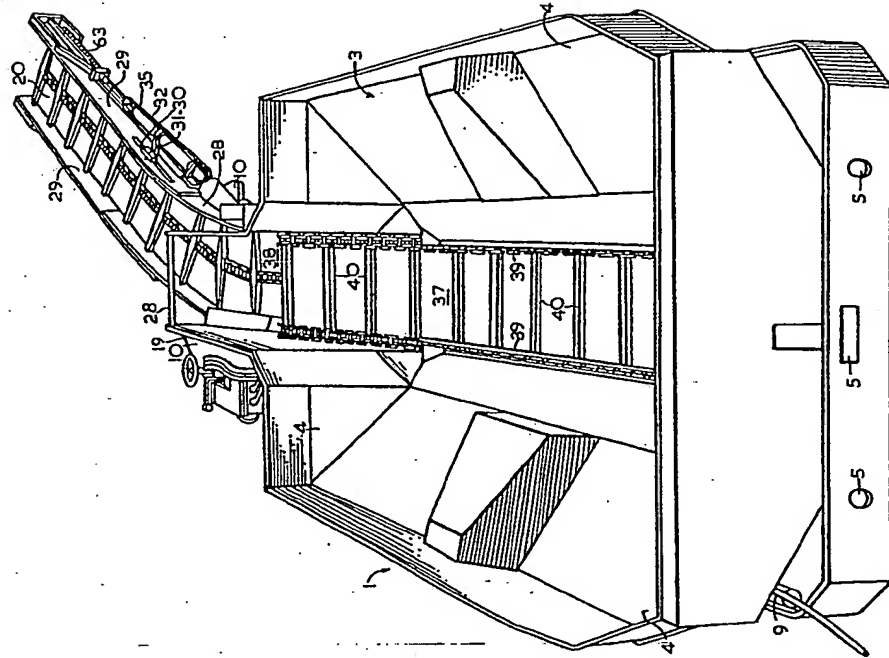


FIG. 1

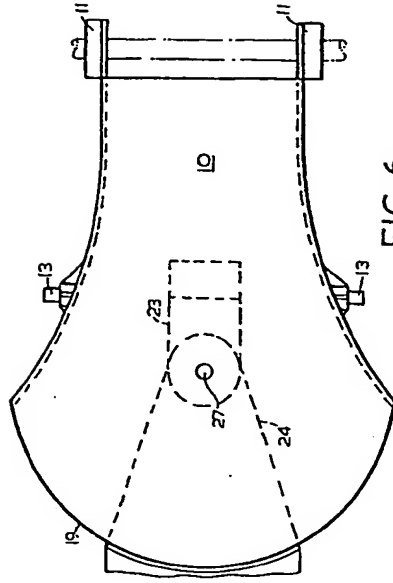


FIG. 6

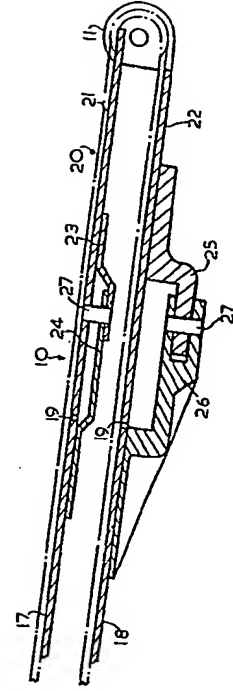
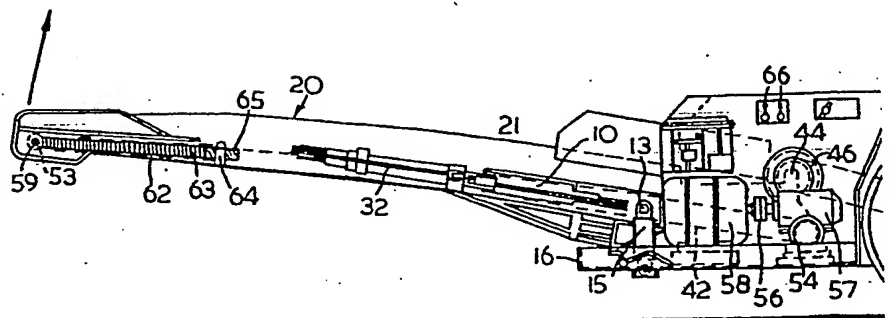
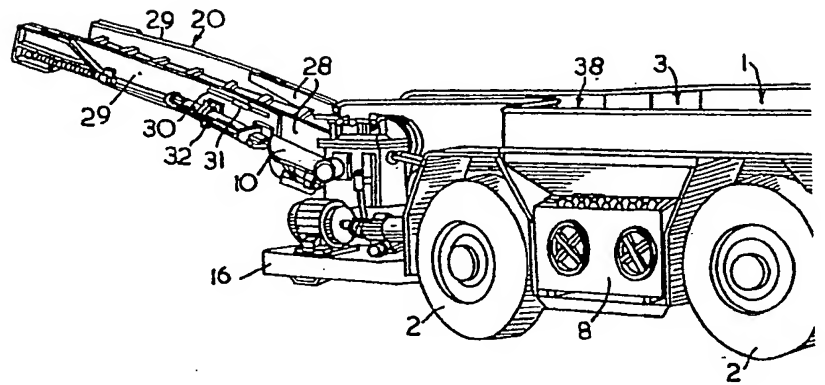
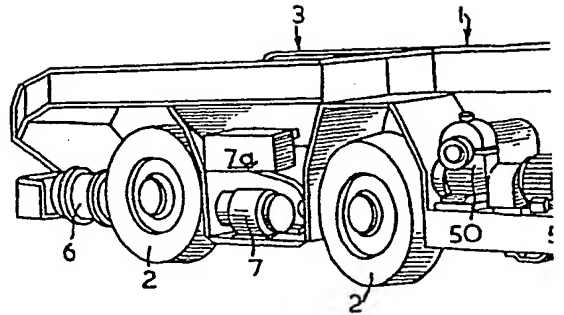
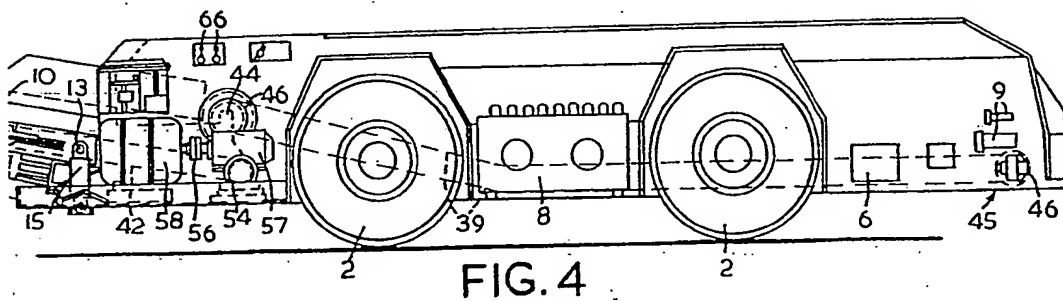
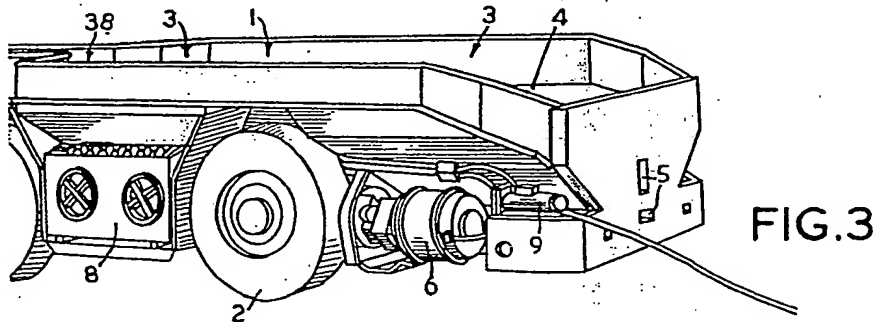
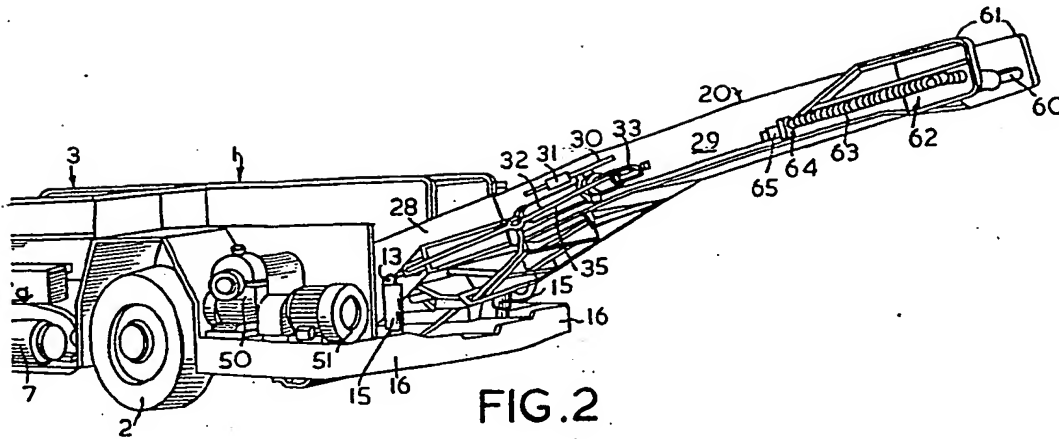


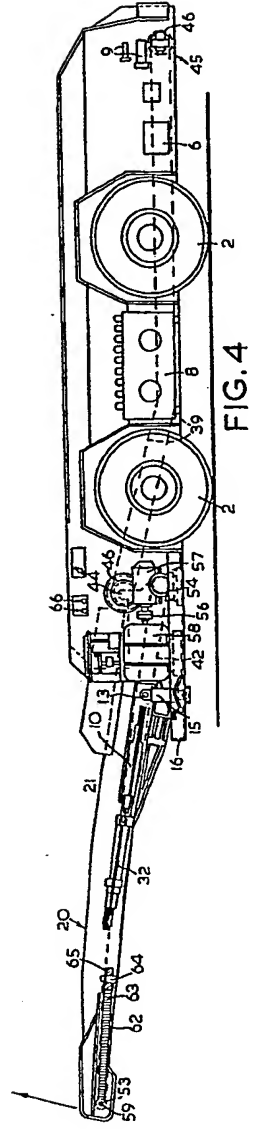
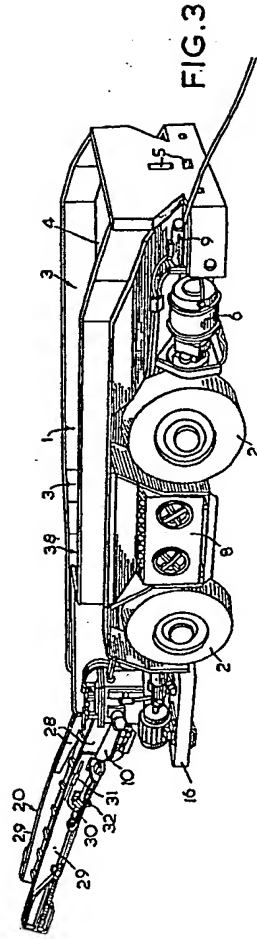
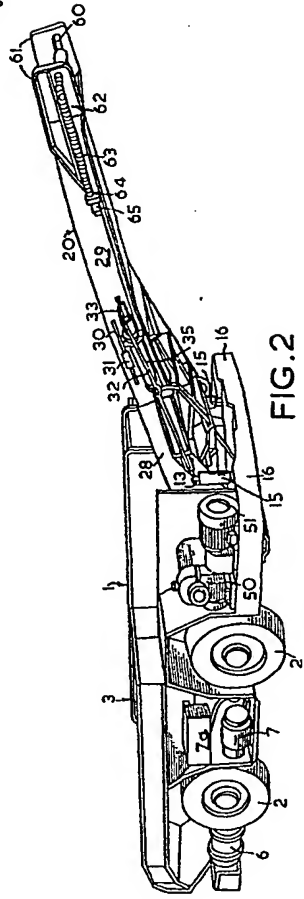
FIG. 7



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4 SHEETS

COMPLETE SPECIFICATION
This drawing is a reproduction of
the Original on a reduced scale.
SHEET 2





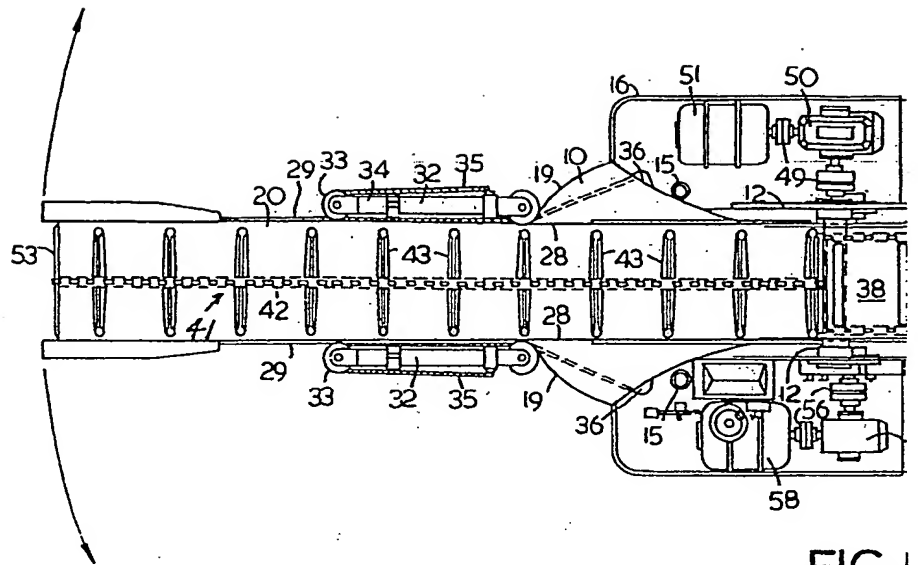


FIG. 1

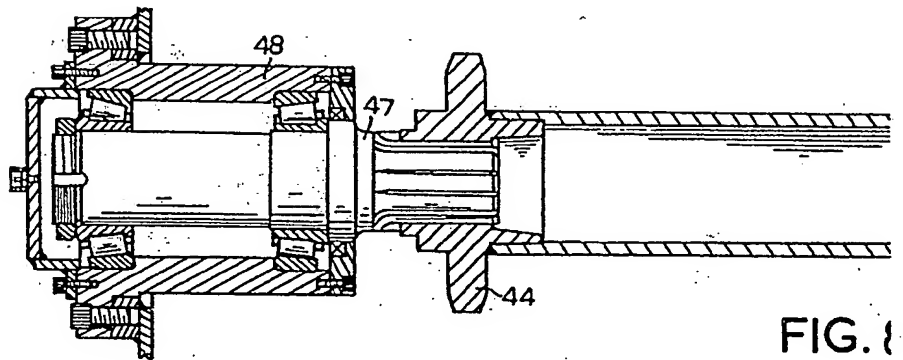


FIG. 8

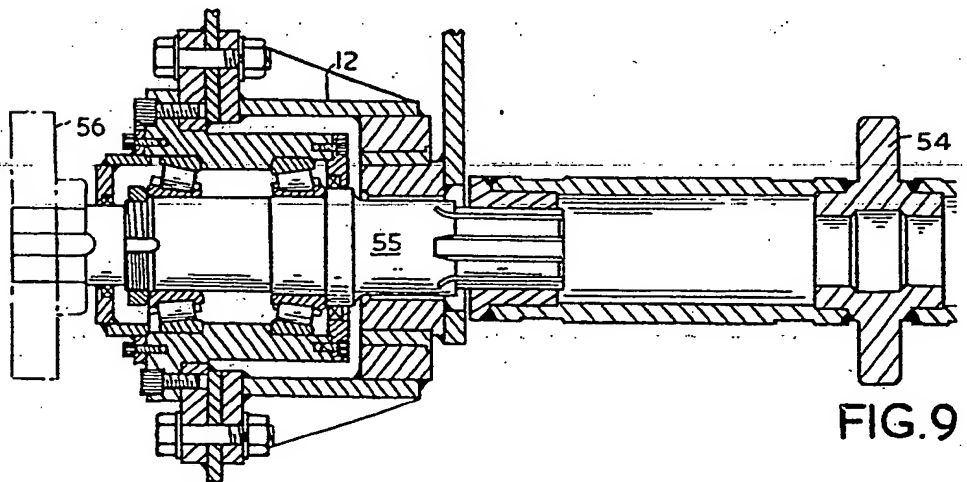


FIG. 9

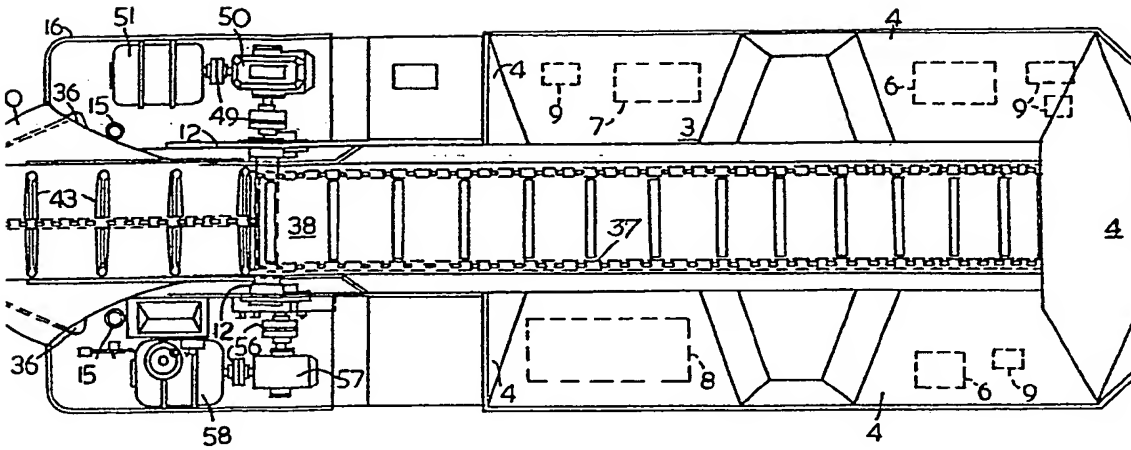


FIG. 5

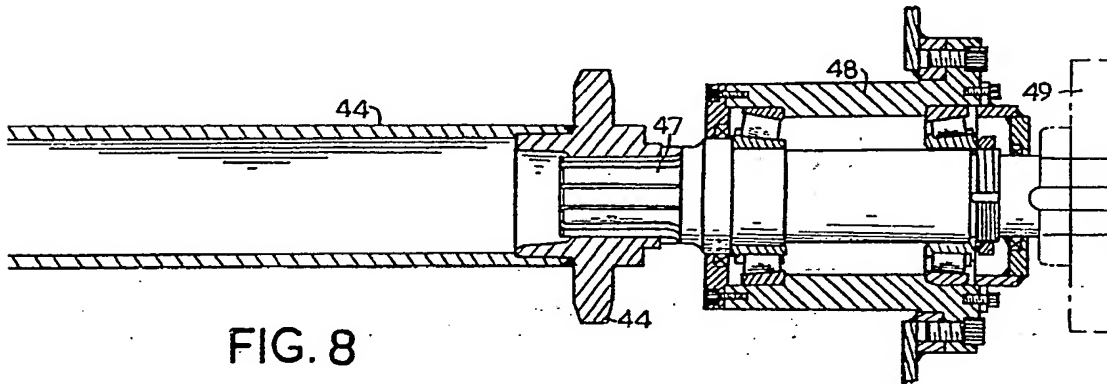


FIG. 8

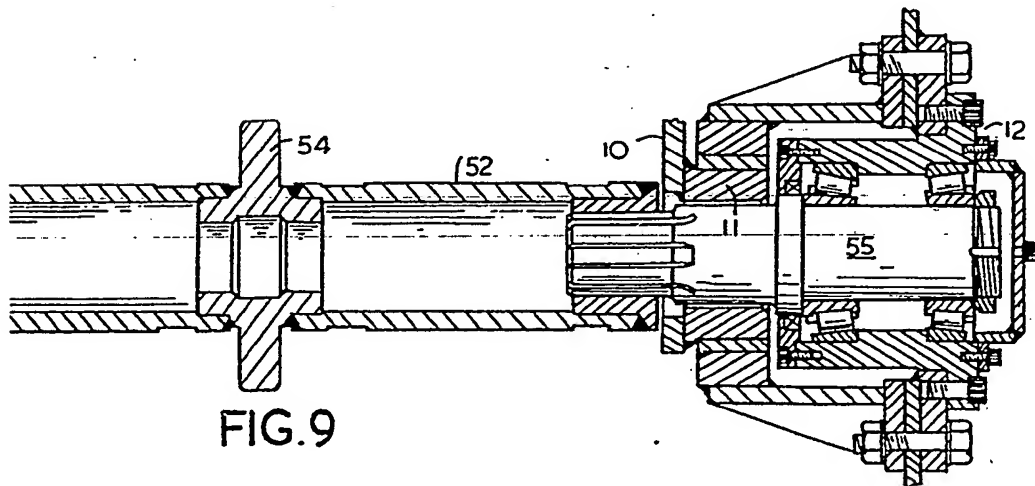


FIG. 9

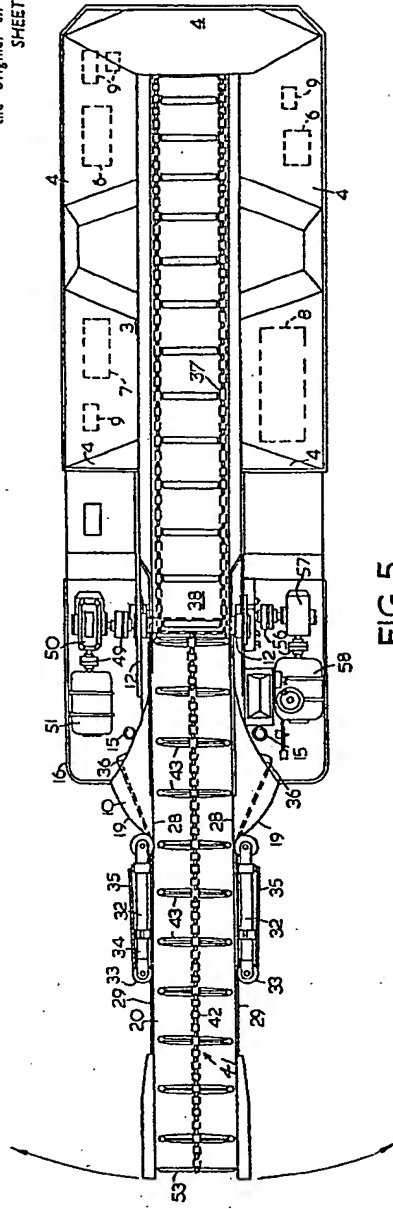


FIG. 5

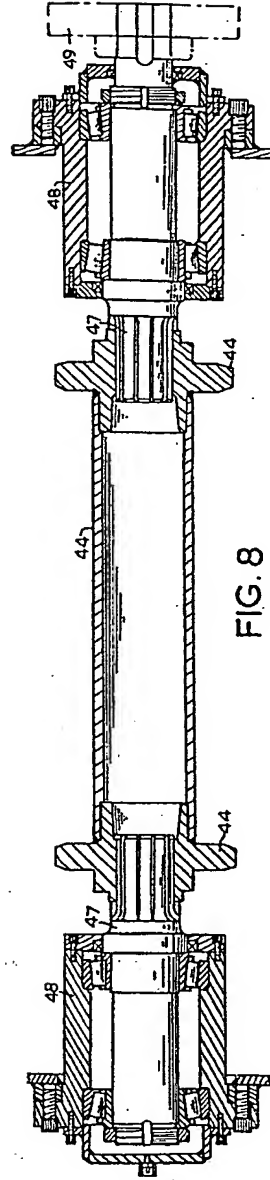


FIG. 8

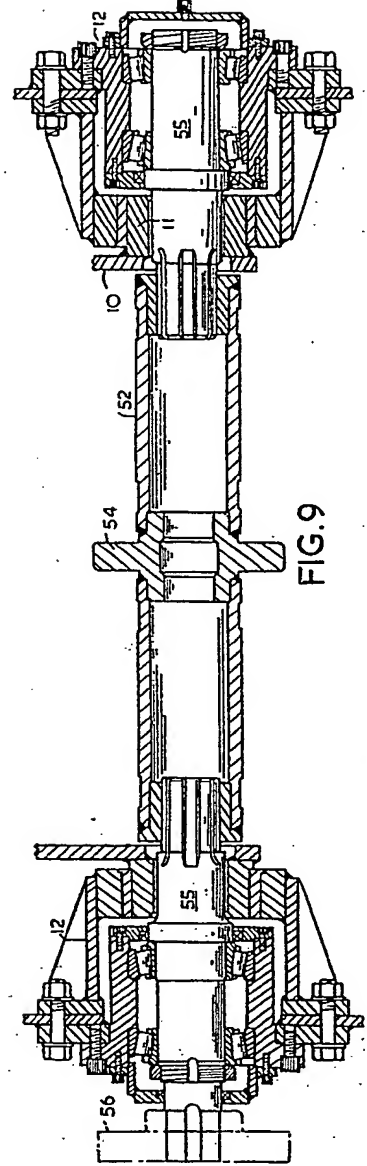


FIG. 9

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